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Re: U.S. v Jamie Clemons
Re: Report of Findings, Amended

Documents Reviewed

U.S. Dept. of Justice, Bureau of Alcohol, Tobacco, Firearms and Explosives, Laboratory Report, March 17, 2021

U.S. Dept. of Justice, Bureau of Alcohol, Tobacco, Firearms and Explosives, Laboratory Report, September 10, 2019

U.S. Dept. of Justice, Bureau of Alcohol, Tobacco, Firearms and Explosives, Laboratory Report, August 22, 2019 [Draft]

STRmix File Storage,

LDIS Specimen Detail Report, various

Local Match Details Report, various

STRmix locus and percentage, untitled, and following

e-mail communication, various

QIAamp Extraction Worksheet, various

Quantifiler, plate map, various

Quantifiler worksheet, various
Quantifiler: standard curves, results table, various

Microcon Concentration, worksheet

GlobalFiler Amplification, worksheet, various

GlobalFiler 3130, set up, plate map, various

Electropherograms
- 5.Q1 17N0360
- 6.Q1 17N0360
- 8.Q1 17N0360
- 18.Q1 17N0360
- 18.Q2 17N0360
- POS071019CT
- RB070919CT
- GF Ladder, various
- 27.Q1 17N0360
- POS082119CT
- NEG052119CT
- 26.Q1 17N0360
- NEG082119CT

Data Interpretation Sheet, ATF Forensic Biology

STRmix analysis output, Sample ID: Ex18Q2-Decon

Report of Findings, (amended)

The Dept. of Justice, Bureau of Alcohol, Tobacco, Firearms and Explosives Laboratory (DOJATFEL) used standard and widely accepted methods and procedures to produce DNA profiles from submitted evidence.
Briefly, a semi-automated approach to DNA extraction and purification was used to recover DNA from four (4) questioned items and two (2) reference standards.

As per accreditation standards the amount of DNA recovered from these items (*i.e.*, post DNA extraction and purification) was measured (estimated) using a dedicated

instrument and a quantitative polymerase chain reaction (qPCR) kit specific for this purpose.

Relying on the qPCR estimates for DNA concentration, DOJATFEL used a commercially available multiplex STR kit (GlobalFiler) to try and generate DNA profiles from the recovered DNA.

This multliplex DNA STR kit uses polymerase chain reaction (PCR) to target twenty-one (21) autosomal short tandem repeat elements, and three (3) sex chromosome genetic elements (Y indel, amelogenin and DYS391). This kit is fully accepted and widely used for forensic DNA profiling.

Four questioned items

exhibit 5: pieces of burnt cloth
exhibit 6: one charred, melted cup
exhibit 8: charred melted plastic cup
exhibit 18: pink garden glove

were processed through DNA extraction, DNA purification, DNA quantification, PCR amplification and finally capillary electrophoresis (CE) analysis.
The data captured by the CE instrument was analyzed using specific software that provides a visual representation of the captured data, an electropherogram.

The electropherogram is then visually inspected and analyzed to generate DNA profile(s).

The DOJATFEL has access to an additional software package, STRmix, to analyze DNA profile mixtures. A mixed DNA profile is a DNA profile that has the alleles from more than one individual (contributor) represented in the electropherogram.

Three (3) additional samples, reference standards from J. Clemons and J. Brack and Nicole McCarthy were also submitted to the DOJARFEL. Although important for the analysis of the electropherograms generated from the questioned items, the laboratory work to develop DNA profiles from reference standards is (or should be) routine – there is essentially unlimited DNA from reference standards and obtaining robust profiles from standards should not present a problem for a forensic DNA laboratory. [Note: reference standards are treated identically to questioned items, *i.e.*, extraction, purification, quantification, multiplex PCR, CE, software analysis.]

An examination of the electropherogram 5.Q1 17N0360 demonstrates that no DNA profile results were obtained from exhibit 5, pieces of burnt cloth.

An examination of the electropherogram 6.Q1 17N0360 demonstrates that no DNA profile results were obtained from exhibit 6, one charred, melted cup.

An examination of the electropherogram 8.Q1 17N0360 demonstrates that no DNA profile results were obtained from exhibit 8, charred melted plastic cup.

Two areas of exhibit 18, pink garden glove, were sampled; Velcro strap and interior palm, wrist and fingertips (18Q1, 18Q2).

An examination of the electropherogram 18.Q1 17N0360 demonstrates that no DNA profile results were obtained from exhibit 18, pink garden glove, Velcro strap.

An examination of the electropherogram 18.Q2 17N0360, exhibit 18, pink garden glove, interior surfaces, demonstrates a mixed DNA profile from at least two (2) contributors one of whom is male.

Analysis of DNA profiles obtained by the current PCR-STR-CE method can only determine the minimum number of contributors to a mixed sample. Here the data are best fit by assuming two (2) contributors, though a third contributor cannot be ruled out.

DOJARFEL declared the electropherogram a mixture of 2 individuals, at least 1 male present and suitable for comparison.

The obligatory positive and negative controls processed by DOJARFEL were unremarkable with one exception; one negative control failed due to poor resolution of internal size standards and this set of injections was repeated.
Despite the perception of perfection that forensic DNA practitioners likes to project, this type of technical failure is routine and re-injections and/or re-prepping (*i.e.*, repeating some steps in the procedure for some samples) is not unusual.

Although two (2) contributors to exhibit 18Q2 are observed on the electropherogram, one profile is stronger than the other. In forensic parlance there is a major profile, *i.e.*, that profile derived from the individual who left more of their DNA on the item and a minor profile, *i.e.*, that profile derived from the individual who left less of their DNA on the item.

Major and minor refer exclusively to the amount of DNA on the exhibit; no inference as to order of addition, timing, how or why the DNA was deposited or importance to the case allegations can be inferred from the terms major and minor.

Although the interpretation of DNA profile mixtures is the most contentious topic in forensic DNA, the DNA profile data from 18Q2 do not require complex and controversial software to be analyzed. A comparison with the authentic reference profile of the defendant reveals that he is not excluded. His identification on the glove is not in dispute.

The presence of a second contributor, most likely a female, is also without dispute.
The availability of a newly obtained reference profile, Lab#1, Agency #35, purported as Known DNA sample from Nicole McCarthy was also compared to the mixed DNA profile obtained from exhibit 18Q2.
The relevant laboratory report declared that there was support for inclusion of Ms. McCarthy as a contributor to exhibit 18Q2. As of this writing the full case file to document this conclusion has not yet been provided; the conclusion from the DOJARFELl will be accepted provisionally.

Exhibit 18 was sampled (*i.e.*, biological material collected) by a using a swab (essentially a large Q-tip) to absorb biological material on the internal surfaces of the garden glove. This sampling technique is a standard and universally practiced technique in forensic DNA analysis. From the qPCR (DNA quantification) results it is possible to determine how much DNA was recovered from the interior of the glove and put this information in context.

The DOJARFEL reported a value of 0.0072 ng/uL in a volume of 100 uL as the concentration and volume of the DNA solution obtained after extraction and purification.
This calculates to 0.72 ng of DNA which would be derived from ~110 cells. In more relatable terms, this amount of DNA is a little less than one would find (on average) in a single fingerprint; think of the smudge on an eyeglass lens from one (1) digit.
A little mountain of 100 cells is well below what can be seen with the naked eye; a professional compound microscope would be required to visualize this number of cells grouped together in a pile.
Although the amount of DNA left behind after 'touch' DNA contact (*i.e.*, no body fluids being transferred), is quite variable, the amount of DNA recovered from the glove is very minimal.

The DOJARFEL consumed the recovered DNA from exhibit 18Q2 in a single GlobalFiler PCR reaction and therefore there remains no additional DNA for further analysis.

Assuming that the conclusions of DOJARFEL in regards to the reference profile from Ms. McCarthy are correct, and that all genetic information obtained from 18Q2 can be accounted for by comparison with the reference standards, these two contributors, Mr. Clemons and Ms. McCarthy would fully identify the contributors to the glove.

Conclusions

Although four (4) questioned items were submitted for forensic DNA analysis, only one (1) questioned exhibit, 18Q2, provided any DNA profile results.

Although the identity of the major contributor to this item (internal swabbing of pink garden glove) is not in dispute, it is far from clear what probative value this profile has. Forensic DNA cannot provide information as to

i) when Mr. Clemons' or Ms. McCarthy's DNA might have been deposited on the glove,

ii) how Mr. Clemons or Ms. McCarthy left their DNA on the glove with the two most likely options being either direct transfer or, considering the amount of DNA left on the item, secondary transfer to the interior of the glove,

iii) neither the timing (*i.e.*, when either contributor made contact with the glove) or the length of time of contact between Mr. Clemons and Ms. McCarthy and the glove can be derived from the identification of these two individuals through DNA profiling, and

iv) what action might have been performed by the two contributors to the glove prior to the glove being collected and processed for DNA profiling.

From the analysis of the forensic DNA profiles, there is no *a priori* reason why the defendant would be more important to the case than Ms. McCarthy.

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